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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/083,684

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Tomonari Yamamoto

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EXAMINER

ERDEM, FAZLI

ART UNIT

PAPER NUMBER

2826

MAIL DATE

DELIVERY MODE

12/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/083,684

Applicant(s)

YAMAMOTO, TOMONARI

Examiner

Fazli Erdem

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6-10, 12-14, 16-19, 21-23, 25-27, 29, 31 and 32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-4, 6-10, 12-14, 16-19, 21-23, 25 and 26 is/are allowed.
- 6) ☒ Claim(s) 27, 29, 31 and 32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 9/20/2007 have been fully considered but they are not persuasive. Applicant argues that "atoms to amorphize single crystal semiconductor" language not to be a functional language. However, it is applicant's burden to establish that the species as disclosed in secondary references, i.e. Talwar et al., is not capable of doing the amorphization function. It is examiner's opinion that the atoms disclosed in Talwar et al., i.e. germanium or argon are able to do the amorphization function. Nevertheless, Talwar et al., does actually teach that germanium or argon species are used for amorphization. Furthermore, these species could be used to dope the source/drain regions of primary reference Toshiyuki et al.

Allowable Subject Matter

1. Claims 1-4, 6-10, 12-14, 16-19, 21-23, 25 and 26 allowed.
2. The following is a statement of reasons for the indication of allowable subject matter:

Prior art failed to establish amorphization method in oblique directions as set forth in the independent claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 27 and 31 rejected under 35 U.S.C. 103(a) as being unpatentable over Toshiyuki et al. (6,906,548) further in view of Talwar et al.

In claim 27, the claim language “the source and the drain regions are constituted by integrating a shallow junction seeping into said single crystal semiconductor under said gate and a deep junction extending under said shallow junction” and “impurities and atoms to amorphize said single crystal semiconductor” is considered product by process claim. The applicant’s claims 27 and 28 do not distinguish over the Toshiyuki et al. reference regardless of the process used to form the source/drain regions and amorphize the source/drain regions, because only the final product is relevant, not the recited process of using laser light in a linear beam with a particular power deviation. See *SmithKline Beecham Corp. v. Apotex Corp.*, Fed. Cir., No. 04-1522, 2/24/06 (“While the process set forth in the product-by-process claim may be new, that novelty can only be captured by obtaining a process claim.”)

Note that when “product by process” claiming is used to describe one or more limitations of a claimed product, the limitations so described are limitations of the claimed product per se, no matter how said product is actually made. In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 706.03(e).

In *SmithKline Beecham Corp. v. Apotex Corp.*, 78 USPQ2d 1097 (2006), the Federal Circuit recently revisited the question of whether a “product by process” claim can be anticipated by a reference that does not recite said process. The Federal Circuit cited with approval this Office’s current statement of the law, found in MPEP § 2113:

[Even] though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

SmithKline Beecham, 78 USPQ2d at 1101.

The Federal Circuit held this statement to be consistent with its own views on this topic, as well as various Supreme Court rulings, notably *Gen. Elec. Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 373 (1938) (“Although in some instances a claim may validly describe a new product with some reference to the method of production, a patentee who does not distinguish his product from what is old except by reference, express or constructive, to the process by which he produced it, cannot secure a monopoly on the product by whatever means produced.”). *Id.*

Regarding Claim 27, Toshiyuki et al. disclose a semiconductor device where in Fig. 9 it is disclosed a semiconductor device having a gate 50, a source 42 and a drain region 44/45 wherein the source and the drain regions include a shallow portion 44 and a deeper portion 45 that seep under the gate electrode 50 and an overlap capacitance between gate and source region is 0.356 fF per micron as shown in column 6 lines 15-27, which is more than 0.25 fF per micron. Toshiyuki et al. fail to disclose the required atoms that are used for doping/implantation. However, Talwar et al. disclose a semiconductor fabrication method where in column 4, lines 45-57 the required argon or germanium species are disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required atoms/species in Toshiyuki et al. as taught by Talwar et al. in order to manufacture semiconductor device with reduces size.

Regarding Claim 31, capacitance in column 6 lines 15-27 is a result of the overlap of the gate electrode and the source/electrode.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 29 and 32 rejected under 35 U.S.C. 103(a) as being unpatentable over Toshiyuki et al. (6,906,548) in view of Rodder (6,093,610) further in view of Talwar et al. (5,908,307)

In claim 29, the claim language "the source and the drain regions are constituted by integrating a shallow junction seeping into said single crystal semiconductor under said gate and a deep junction extending under said shallow junction" and "impurities and atoms to amorphize

said single crystal semiconductor” is considered product by process claim. The applicant’s claims 27 and 28 do not distinguish over the Toshiyuki et al. reference regardless of the process used to form the source/drain regions and amorphize the source/drain regions, because only the final product is relevant, not the recited process of using laser light in a linear beam with a particular power deviation. See *SmithKline Beecham Corp. v. Apotex Corp.*, Fed. Cir., No. 04-1522, 2/24/06 (“While the process set forth in the product-by-process claim may be new, that novelty can only be captured by obtaining a process claim.”)

Note that when “product by process” claiming is used to describe one or more limitations of a claimed product, the limitations so described are limitations of the claimed product per se, no matter how said product is actually made. In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 706.03(e).

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[Even] though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

SmithKline Beecham, 78 USPQ2d at 1101.

The Federal Circuit held this statement to be consistent with its own views on this topic, as well as various Supreme Court rulings, notably *Gen. Elec. Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 373 (1938) (“Although in some instances a claim may validly describe a new product with some reference to the method of production, a patentee who does not distinguish his product from what is old except by reference, express or constructive, to the process by which he produced it, cannot secure a monopoly on the product by whatever means produced.”). *Id.*

Regarding Claim 29, Toshiyuki et al. disclose a semiconductor device where in Fig. 9 it is disclosed a semiconductor device having a gate 50, a source 42 and a drain region 44/45 wherein the source and the drain regions include a shallow portion 44 and a deeper portion 45 that seep under the gate electrode 50 and an overlap capacitance

between gate and source region is 0.356 fF per micron as shown in column 6 lines 15-27, which is more than 0.25 fF per micron. Toshiyuki et al. fail to disclose the required source/seeping greater than the drain seeping and the required atom/impurity types. (Although in Fig. 9 of Toshiyuki et al. source region 42 extends further along the drain region 44 under gate electrode 50 Toshiyuki does not state this in the spec). However, Rodder disclose a self-aligned pocket process for deep sub micron CMOS devices and the device where in column 2, lines 32-50, source extension is made larger than the drain extension. Furthermore, in column 4, lines 55-65, to dope the source/drain regions, As (Arsenic) atom/impurity is used. Finally, Talwar et al. disclose a method of manufacturing a semiconductor device where in column 4, lines 45-57, the required atoms/species are disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required source extension and the required impurity doping in Toshiyuki et al. as taught by Rodder and Talwar et al., respectively, in order to form shallow drain extension as disclosed in column 4, lines 40-50 of Rodder.

Regarding Claim 32, capacitance in column 6 lines 15-27 of Toshiyuki et al, is a result of the overlap of the gate electrode and the source/electrode.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fazli Erdem whose telephone number is (571) 272-1914. The examiner can normally be reached on M - F 8:00 - 5:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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FE
November 30, 2007


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SUPERVISORY PATENT EXAMINER